REMARKS

In the Office Action, the Examiner stated that claims 1-18 are pending in the application and that claims 1-18 stand rejected. By this response, claims 1-2 and 10-11 are amended to more clearly define the invention of the Applicant and not in response to prior art. All other claims continue unamended.

In view of the amendments presented above and the following discussion, the Applicant respectfully submits that none of these claims now pending in the application are anticipated under the provisions of 35 U.S.C. § 102 or rendered obvious under the provisions of 35 U.S.C. § 103. Thus the Applicant believes that all of these claims are now in allowable form.

Rejections

A. 35 U.S.C. § 102

The Examiner rejected the Applicant's claims 1-2, 8-11, 17 and 18 under 35 U.S.C. § 102(e) as being anticipated by Suito et al. (US Patent No. 6,925,340, hereinafter "Suito"). The rejection is respectfully traversed.

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim" (Lindemann Maschinenfabrik GmbH v. American Hoist & Derrik Co., 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1983)). (emphasis added). The Applicant respectfully submits that Suito fails to teach each and every element of at least the Applicant's claim 1, which specifically recites:

> "A method for audio content playback during video trick mode playback, comprising:
> reading a coded digital data from a storage medium, said coded digital data comprising a video programming and corresponding audio programming;
> decoding from a portion of said digital data comprising said audio programming a plurality of digital audio samples corresponding to a selected portion of the video programming;
> **repeating or dropping selected ones of said digital audio samples at a rate corresponding to a selected trick mode video playback speed of said video programming**; and
> **key shifting a playback audio pitch associated with said audio samples to compensate for said trick mode playback.**" (emphasis added).

With respect to at least claim 1, the Applicant's invention is directed at least in part to a method for playing an audio track during video trick mode playback of a video presentation including reading coded audio programming from a storage medium, decoding the audio programming and key shifting a playback audio pitch associated with the decoded audio to compensate for the trick mode playback.

In support of at least claim 1, the Applicant in the Specification specifically recites:

> "The player 100 can also preferably include a karaoke processor 186 under the control of CPU 122 for performing audio frequency shifting during video trick modes. Karaoke processor 186 receives from audio decoder 184 digital audio corresponding to a selected video performance that is being played. In standard, non-trick playback modes, the karaoke processor can remain inactive and the audio D/A 184 can process digital audio received from the audio decoder 184. When a trick mode playback has been selected, however, the audio D/A can be configured to receive specially processed digital audio from the karaoke processor.
>
> Karaoke processor 186 can comprise any of a number of commercially available processors that are designed to perform conventional karaoke functions, provided however that the karaoke processor preferably provides at least a key control function. In the karaoke context, this feature is commonly used for adjusting the pitch (or audio frequency) of the music to more closely match the pitch of the singer, without changing the tempo of such music. Integrated circuit processors for performing key control functions are well known. For example, devices such as the M65840FP Digital Key Controller, and M65840SP Digital Key Controller are available from Mitsubishi Electric & Electronics USA, Electronic Device Group, 1050 East Arques Avenue, Sunnyvale, CA 94085. Key control processors can operate in the analog or digital domain and either approach can be used with the present invention. Such processors commonly make use of various algorithms and approaches for accomplishing key control." (See Specification, page 4, line 31 through page 5, line 17).

The Applicant further specifically recites:

> "As shown in Figure 3, input audio can be split between high and low pass processing paths established by high pass filter 302 and low pass filter 304. The high pass path processes tempo/beat information whereas the low pass path processes audio voice and accompaniment information. The low pass path is sampled by A/D converter 306 running at a clock rate F_A. Clock rate F_A is preferably at least 10X the highest expected input audio frequency. The sampled low pass frequency components are then placed in a memory storage such as RAM 308. Digital-to-analog converter 310 reads data from RAM 308 at a desired output rate F_B where:
>
> Key shift = $Log_2 (F_B/F_A)$

For example, if $F_B = 2F_A$, then the pitch is one octave higher. A low pass filter 312 is also provided to remove clock noise and harmonics. A gain adjust unit can also be provided to produce a desired audio output level." (See Specification, page 5, lines 20-33).

And:

"In step 208, the control CPU 122 can configure the audio decoder 182 to drop audio samples at a rate of every *n* samples. Dropping audio samples in this manner has the advantageous effect of speeding up the audio to match the speed of the video. However, if the remaining audio samples were simply passed to the audio D/A 184 for subsequent conversion to analog format, then the result would be a key shift in the audio by a factor of *n*. This key shift will cause voices to be high pitched and difficult to understand. Accordingly, the digital audio output from the audio decoder 182 can be pre-processed in karaoke processor 186. Accordingly, in step 210, the control CPU advantageously selects the karaoke processor 186 as the input for audio D/A 184. The karaoke processor receives digitized audio from the audio decoder 182 and pre-processes such audio for more natural sound.

In step 212 the control CPU 122 can selectively configure the key control function of karaoke processor 186 to shift the audio key or frequency by 1/*n*. In particular, by utilizing the key control function of the karaoke processor, the key or pitch of the digitized audio can be shifted down by a factor 1/*n* to compensate for the selective elimination of every *n* audio samples in the audio decoder 182. Moreover, since the karaoke processor preferably shifts the audio pitch without altering the tempo or rate of the audio, spoken words associated with the video presentation will be played back more rapidly due to the selective elimination of audio samples but will have a relatively normal pitch." (See Specification, page 7, lines 3-22).

As evident from at least the portions of the Applicant's Specification presented above, in the invention of the Applicant an apparatus and method for audio content playback during video trick mode playback includes repeating or dropping selected digital audio samples at a rate corresponding to a selected trick mode video playback speed of a video programming and key shifting a playback audio pitch associated with the audio samples to compensate for the trick mode playback.

In contrast to the invention of the Applicant, Suito is directed to a sound reproduction method and sound reproduction apparatus. In Suito, the method delimits a sound signal reproduced at a recording medium at a speed higher than a normal speed into successive processing unit periods. For each processing unit period, sound absence portion(s) of the reproduced sound signal are deleted (or partially deleted) within a range corresponding to a normal speed reproduction. Sound presence portions preceding and following the deleted absence portions

are joined or compressed to produce a recognizable sound signal. However, there is absolutely no teaching, suggestion or disclosure in Suito for "repeating or dropping selected ones of said digital audio samples at a rate corresponding to a selected trick mode video playback speed of said video presentation" or "transforming said digital audio samples from time domain to corresponding frequency domain audio samples" or "scaling a playback audio frequency of said frequency domain audio samples in accordance with said trick mode playback" as taught in the Applicant's Specification and claimed in at least the Applicant's claim 1.

More specifically, in contrast to the invention of the Applicant Suito does not teach, suggest or disclose "repeating or dropping selected ones of said digital audio samples at a rate corresponding to a selected trick mode video playback speed of said video presentation" as taught in the Applicant's Specification and claimed in at least the Applicant's claim 1. Instead, in Suito sound absence portion(s) of a reproduced sound signal are deleted (or partially deleted) within a range corresponding to a normal speed reproduction and sound presence portions proceeding and following the deleted absence portions are joined or compressed to produce a recognizable sound signal during higher than normal speed reproduction. That is, Suito teaches deleting sound absence portions and not repeating and dropping selected digital audio samples as taught and claimed in the Applicant's invention.

Even further, there is absolutely no teaching, suggestion or disclosure in Suito for "key shifting a playback audio pitch associated with said audio samples to compensate for said trick mode playback" as taught in the Applicant's Specification and claimed in at least the Applicant's claim 1. More specifically and as recited above, the Applicant teaches that in one embodiment a key control function of a processor (e.g., a karaoke processor) is used to adjust the key or pitch of the digitized audio (e.g., by a factor $1/n$) to compensate for the selective elimination of every n audio samples in the audio decoder to correspond with a selected trick mode playback. The Applicant teaches that since the processor shifts the audio pitch without altering the tempo or rate of the audio, spoken words associated with the video presentation will be played back, for example, more rapidly due to the selective elimination of audio samples, but will have a relatively normal pitch.

There is absolutely no teaching, suggestion or disclosure in Suito for such key shifting. More specifically, as cited by the Examiner, Suito specifically recites:

> "FIG. 3 shows a construction of the amplitude suppress ion processing section 70. Referring first to FIG. 3, sound data of an output of the MPEG audio decoder 14 described above are inputted as an input sound signal to an input terminal 71 of the amplitude suppression processing section 70. The input sound signal is supplied to a consonant component separation filter 72 and a formant component separation filter 73, and consonant components in the input sound signal are extracted by and outputted from the consonant component separation filter 72. Meanwhile, where the pass-band of the formant component separation filter 73 is set, for example, to 150 to 1,000 Hz, a pitch component and a formant component in the input sound signal are extracted by and outputted from the formant component separation filter 73.
>
> The output of the formant component separation filter 73 is supplied to a level detection section 74, by which the output of the formant component separation filter 73 is, for example, full-wave rectified. A rectification output then is supplied to a low-pass filter whose pass-band is 60 Hz or less, and a level of an output of the low-pass filter is detected thereby to detect a sound level of the input sound signal and thus obtain a level detection value E. Where the sound level is detected only from the pitch component and the formant component in this manner, the resulting level detection value E has a minimized influence of noise." (See Suito, col. 7, lines 22-46).

As clearly depicted by at least the portion of Suito presented above, in Suito a frequency characteristic correction filter mixes the output of the consonant component separation filter and an output of the amplitude suppression section and performs a required frequency characteristic correction process, such as equalizing processing for a signal obtained by the mixture. However the Applicant respectfully submits that there is absolutely no teaching, suggestion or disclosure in Suito for "key shifting a playback audio pitch associated with said audio samples to compensate for said trick mode playback as taught in the Applicant's Specification and claimed in at least the Applicant's claim 1. In fact in Suito, the only mention of pitch is in relation to the amplitude suppression circuit of Suito, which suppresses the amplitude of sound data of an output of an MPEG audio decoder at a termination portion of a continuous sound portion. However, the Applicant respectfully submits that there is absolutely no teaching suggestion or disclosure in Suito for key shifting a playback audio pitch associated with audio

samples to compensate for a trick mode playback as taught in the Applicant's Specification and claimed in at least the Applicant's claim 1.

For at least the reasons recited above, the Applicant respectfully submits that Suito fails to teach, suggest or disclose at least each and every element of the Applicant's claimed invention, arranged as in at least the Applicant's claim 1 as required for anticipation. Therefore, the Applicant respectfully submits that the teachings and disclosure of Suito do not anticipate the Applicant's invention, at least with respect to independent claim 1.

Therefore, the Applicant submits that for at least the reasons recited above, independent claim 1 is not anticipated by the teachings of Suito and, as such, fully satisfies the requirements of 35 U.S.C. § 102 and is patentable thereunder.

Likewise, independent claim 10 recites similar relevant features as recited in the Applicant's independent claim 1. As such, the Applicant respectfully submits that for at least the reasons recited above independent claim 10 is also not anticipated by the teachings of Suito and also fully satisfies the requirements of 35 U.S.C. § 102 and is patentable thereunder.

Furthermore, dependent claims 2, 8-9, 11, 17 and 18 depend either directly or indirectly from independent claims 1 and 10 and recite additional features therefor. As such and for at least the reasons set forth herein, the Applicant submits that dependent claims 2, 8-9, 11, 17 and 18 are also not anticipated by the teachings of Suito. Therefore the Applicant submits that dependent claims 2, 8-9, 11, 17 and 18 also fully satisfy the requirements of 35 U.S.C. § 102 and are patentable thereunder.

The Applicant reserves the right to establish the patentability of each of the claims individually in subsequent prosecution.

B. 35 U.S.C. § 103

The Examiner rejected the Applicant's claims 3-7 and 12-16 as being unpatentable over Suito as applied to claims 1 and 10 above, and further in view of Shimura (US Patent No. 6,658,197). The rejection is respectfully traversed.

The Examiner applied the Suito for teaching all of the aspects of the Applicant's claims 1 and 10 but concedes that the Suito fails to teach repeating selected ones of the audio samples at a rate inversely proportional to a selected

trick mode video playback speed of said video presentation to produce a trick mode set of audio samples, and generating an audio playback signal corresponding to said trick mode set of said audio samples. However, the Examiner cites Shimura for teaching repeating selected ones of the audio samples at a rate inversely proportional to a selected trick mode video playback speed of said video presentation to produce a trick mode set of audio samples, and generating an audio playback signal corresponding to said trick mode set of said audio samples. The Applicant respectfully disagrees.

Claims 3-7 and 12-16 are dependent claims that depend either directly or indirectly from independent claims 1 and 10, respectively. As described above, the Applicant submits that the teachings of Suito fail to teach, suggest or anticipate the Applicant's claims 1 and 10 for at least the reasons recited above. As such and at least because the teachings of Suito fail to teach, suggest or anticipate the Applicant's claims 1 and 10 for at least the reasons recited above, the Applicant further submits that the teachings of Suito fail to teach, suggest or render obvious the Applicant's claims 3-7 and 12-16 which depend directly or indirectly from the Applicant's claims 1 and 10, respectively.

Furthermore, the Applicant submits that the teachings of Shimura fail to bridge the substantial gap between the teachings of Suito and the invention of the Applicant. More specifically, the Applicant submits that the teachings of Shimura for an audio signal reproduction apparatus and for reproducing a digital audio signal recorded on a recording medium by a predetermined number of samples, at a recording medium travel speed different from the travel speed during the recording fail to teach, suggest or make obvious a method and apparatus playing an audio track during video trick mode playback of a video presentation including at least "repeating or dropping selected ones of said digital audio samples at a rate corresponding to a selected trick mode video playback speed of said video presentation" or "key shifting a playback audio pitch associated with said audio samples to compensate for said trick mode playback" as claimed by the Applicant's independent claims 1 and 10.

That is, Shimura specifically recites:

"This digital VTR, when reproducing a digital data from the inclined recording track on the magnetic tape, enables a user to select between a normal reproduction mode in which the magnetic tape travels at the same speed as when the digital data was recorded, and a variable reproduction mode (so called jog reproduction mode) in which the magnetic tape travels slower than when the digital data was recorded." (See Shimura, col. 3, lines 34-40).

And

"Now the user has selected the jog reproduction mode to perform a reduced speed reproduction. The reproduction speed detector 11 detects a current reproduction speed from the VTR reel and FG attached to the capstan and supplies the obtained information to the write/read controller 9, to the pitch variable calculator 10, and to the jog speed command block 12." (See Shimura, col. 5, lines 9-15).

And

"According to the calculated speed information v and the sample count data n, the total sample count calculator 104 calculates a total number of samples m required for pitch variable processing as follows:

m=n.div.(v.div.100)

and outputs it as the total sample count data. It should be noted that this total sample count m indicates a sample count (n.div.s) required for expressing an audio data of one frame with the same sampling frequency as the sampling frequency during recording when performing lower speed S (S=v.div.100, where S<1) reproduction.

The interpolation calculator 105, referencing the total sample count data m, calculates an interpolation data based on two adjacent audio data DA samples and inserts the interpolation between the two samples at an identical temporal interval, so as to create a changed reproduction data of total sample count m." (See Shimura, col. 5, line 58 through col. 6, line 8).

And

"Now, in the pitch variable calculator 10, when the aforementioned digital audio data DA stored in the memory 13 is read out by the address control signal from the write/read controller 9, according to the specified speed of the switching speed specifier 101, the speed information calculator 102 converts the actual speed information from the reproduction speed detector 11, into the calculation speed information as shown in FIG. 4 and determines the period of time for pitch fixed or pitch variable.

In FIG. 4, if .times.1 speed is assumed to be 100, .times.1/2 speed is 50, .times.1/3 is 33, and .times.1/10 is 10. The switching point between the pitch fixed period and the pitch variable period is when the actual speed has become .times.1/3 or below.

In the pitch fixed period, the same pitch as the normal .times.1 is applied, and as the calculated speed, information of 100 is repeated. In the pitch variable period, the actual speed is changed in combination with the aforementioned calculated speed." (See Shimura, col. 6, lines 20-37).

And

"The digital audio data DA calculated by this pitch variable calculator 10 is sent to the digital signal processor (DSP) 14 and subjected to filtering and other digital processing before supplied to the sampling rate converter

> (SCR) 15. In the SCR 15, the audio digital data DA from the DSP 14 is rate converted by the sampling clock locked to the output system and output as a digital output from an output terminal 16." (See Shimura, col. 7, lines 5-11).

As clearly evident from at least the portions of the disclosure of Shimura presented above, in Shimura a user can select a jog reproduction mode in which the magnetic tape travels slower than when the digital data was recorded. In contrast to the invention of the Applicant, in Shimura when a jog mode is selected a total sample calculator determines a total sample count data from tape speed information and sample count data. From the total sample count data, an interpolation calculator calculates an interpolation data based on two adjacent audio data samples and inserts the interpolation data between the two samples. Subsequently, a speed information calculator converts actual speed information from a reproduction speed detector into calculation speed information and determines the period of time for pitch fixed or pitch variable. In Shimura, during the pitch variable period, the actual speed is changed in combination with the aforementioned calculated speed.

However, the Applicant respectfully submits that there is absolutely no teaching, suggestion or disclosure in Shimura for at least "repeating or dropping selected ones of said digital audio samples at a rate corresponding to a selected trick mode video playback speed of said video programming" as taught in the Applicant's Specification and claimed by at least the Applicant's claims 1 and 10. That is in contrast to the teachings of Shimura, in the invention of the Applicant selected decoded audio samples are repeated or dropped at a rate corresponding to a selected trick mode video playback speed of the video programming. In the invention of the Applicant, a trick mode video playback speed is used to determine a number of audio samples to add or drop. Shimura does not teach, suggest or anticipate adding or dropping selected decoded audio samples at a rate corresponding to a selected trick mode video playback speed because in Shimura there is no trick mode but an actual reduction in speed of a digital video tape.

Even further, the Applicant respectfully submits that there is absolutely no teaching, suggestion or disclosure in Shimura for at least "key shifting a playback audio pitch associated with said audio samples to compensate for said trick mode

playback" as taught in the Applicant's Specification and claimed by at least the Applicant's claims 1 and 10. That is in contrast to the teachings of Shimura, in the invention of the Applicant a playback audio pitch associated with decoded audio samples are key shifted to compensate for the trick mode playback. In the invention of the Applicant, after audio samples have been added or dropped at a rate corresponding to a selected trick mode video playback speed, the remaining audio samples are key shifted to compensate for the adding or dropping of the audio samples due to the trick mode playback. Shimura does not teach, suggest or anticipate key shifting a playback audio pitch associated with decoded selected audio samples to compensate for a trick mode playback because in Shimura there is no trick mode but an actual slowing down of a video tape. As such, the Applicant submits that the teachings of Suito and Shimura in an combination fail to render obvious the Applicant's claims.

Therefore, the Applicant submits that for at least the reasons recited above, independent claims 1 and 10 are not rendered obvious by the teachings of Suito and Shimura, alone or in any allowable combination, and, as such, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder. As such and at least because the teachings of Suito and Shimura, alone or in any allowable combination, fail to teach, suggest or render obvious the Applicant's claims 1 and 10 for at least the reasons recited above, the Applicant further submits that the teachings of Suito and Shimura, alone or in any allowable combination, also fail to teach, suggest or render obvious the Applicant's claims 3-7 and 12-16 which depend directly or indirectly from the Applicant's claims 1 and 10, respectively, and, as such, claims 3-7 and 12-16 fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

The Applicant reserves the right to establish the patentability of each of the claims individually in subsequent prosecution.

Conclusion

Thus the Applicant submits that none of the claims, presently in the application, are anticipated under the provision of 35 U.S.C. § 102 or rendered obvious under the provisions of 35 U.S.C. § 103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly,

both reconsideration of this application and its swift passage to issue are earnestly solicited.

If however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion, it is respectfully requested that the Examiner telephone the undersigned.

No fee is believed due. However, if a fee is due, please charge the additional fee to Deposit Account No. 07-0832.

Respectfully submitted,
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